THE THEORY OF DIFFERENTIAL RATES

SUMMARY

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I

THE present paper is a continuation of that published in the previous issue of this Journal on electrical rate theory and practice. But it directs attention to principles which are generally applicable, and which are of special interest in connection with electricity supply only because they are there applied under circumstances peculiarly favorable to clearness of development and explanation.

The economic foundation for differential rates is the desirability of more fully utilizing a fixed-capital investment through the granting of specially low rates to business that can only so be obtained. Fixed capital is

seldom or never utilized to its full capacity throughout a specified period, for example, a year. It should be noted that "full utilization," as the expression is here used, is a matter of economic technology rather than of finance. That the capital be utilized enough to earn a fair rate of return under existing conditions is not the point.

A railway line operating only three or four trains a day furnishes an illustration of one important kind of low degree of utilization. The electrical central station with a low load factor — indeed, with any sort of load factor actually experienced — affords another illustration of low degree of utilization, less generally appreciated, but even more forcibly appropriate. It is obvious that both these situations — and the load factor, moreover, usually acts in reënforcement of the density factor — stimulate the ambition of managers to get additional business, and they make profitable the concession of low rates, of course within limits, in order to get such business. In the case of the load-factor motive, however, not every sort of business will do. Moreover, the condition of the successful pursuit of a differential policy is that the higher rates from the older business, or the profits from that business, be not substantially impaired by the transfer of consumers from the old classes to the new class.

II

It seems to the writer that economists have tended to invert the natural order in assuming that the original or "normal" condition is one of uniformity of price for all the units of a homogeneous supply. It is generally assumed that uniformity of price — whatever that may mean — is natural and to be expected; and that, con-

sequently, the investigator's task is to explain why and how differentiation emerges. The writer does not think this is true. Among primitive peoples, price, to the stranger at least, is determined by individual bargaining without reference to any standard. Even among peoples living under the conditions of Western civilization, especially outside the cities, uniformity of price, if it prevails, is something to be maintained by watchful care, rather than something any departure from which calls for explanation.

The forces that maintain price uniformity, or a "one-price system," furthermore, seem to be primarily moral and only secondarily economic. Competition prevents the shopkeeper from taking all the profit he can wherever he can, chiefly because each consumer becomes indignant if he finds ground for suspecting that he is paying more than others. The dealer known to be "fair" will get the trade. If, or so far as, a dealer can obtain a monopoly, he is, it is true, to a degree emancipated from this restriction imposed by the moral sentiments of purchasers. But even the monopolist will try to conceal or palliate discrimination. On the other hand, if the public will accept some kinds of differentiation as fair and reasonable, the shopkeeper can practise these without the protection of a monopoly. The retail trader sells goods with the added convenience of city delivery for the same price as that at which he sells identical goods to be taken home by the purchaser. He is often ready to pay express charges on sizeable orders to be sent "within one hundred miles of New York." His cash and credit prices are the same. He holds "special sales" so far as he can do so without losing trade at the regular prices. Your corner grocer would in many cases be quite willing to charge a different price to each different customer for the same good if he could do

so without offending the community's sense of fairness. Not in all cases, of course, for in many other cases his own sense of what is fair and just would restrain him, apart from any pressure of public opinion. All this, it may be said, is because the consumer is willing to let retail trade be less analytically competitive than the purchasing dealer is disposed to allow wholesale trade to be. But this influence is still primarily the moral factor. Among dealers themselves, certainly the most commercially minded are not those least inclined to "shade" prices.

One of the first things a combination does is to cut down extended and easy credits; that is, it does away with one sort of differentiation. Book publishers coöperate to maintain uniformity of prices. The entrenched monopoly seems to be quite as willing to lump consumers as to classify them carefully, tho differentiation usually pays better, especially when the product is subject to competition from other kinds of business enterprises. But in this case, and to a less degree in others, doubtless economic factors are working in the same direction as the moral factors; notably, the cost to both dealer and consumer of making an individual bargain with each sale.

The scope of the public's demand that prices be fixed and uniform is, of course, limited by the perceptual discrimination of classes of goods as different from each other. But from an economic point of view it does not matter much just how the public draws the line between homogeneity and heterogeneity. Tho the public still needs educating as regards classification, certainly at present it is disposed to tolerate much price differentiation.

III

Regardless of whether moral public opinion or strictly economic factors are the more potent in bringing about uniformity of prices, it should be readily admitted that the only practicable way of determining what goods are homogeneous or what articles belong in the same class is to let the question be answered by the common sense of the public. Grounds for the acceptance of differences in prices may not appear in the material goods but in the supply of some associated service; on the other hand, the public may refuse to consider relevant differences in associated services, or in the goods or principal services, if the differences are small. In other words, two things belong for price-making purposes to different classes or to the same class according to what people in general think about it. If the public will accept a distinction between the carriage of cord wood and the carriage of coal a given number of ton-miles, the two services may be considered not homogeneous. Similarly the public may be willing to accept differentiation as between gas for fuel and gas for lighting, between kilowatt hours used for light and kilowatt hours used for power, between kilowatt hours sold to a church and kilowatt hours sold to a theatre, between a kilowatt hour that is one of ten supplied to one consumer in a month and a kilowatt hour that is one among ten thousand supplied to another, between kilowatt hours used for lighting before 6 P.M., and after 6 P.M. — or the public may not be willing to accept some of these distinctions. It is significant how well electrical supply puts to the test what sorts of goods and services one may consider homogeneous and what not.

In an important recent discussion of this subject the question as to what is to be considered joint cost, and

what not, has been made to hinge on the definition of homogeneity.[1] This seems to the writer insecure ground. At least one would expect the definition to hinge on economic effects rather than mere physical qualities. The economic distinction between product and by-product should consist not in the fact that they are two — twoness is a relative as well as a commonplace matter — but in the fact that contributions to the two supplies are closely bound together so that one supply cannot be increased in quantity without increasing the other at something like the same rate. Let the two supplies be distinguished any way you will. Absence of interchangeability or of the possibility of substituting one for the other seems to be the proper economic criterion. The form of the demand curve is significant, but hardly the decisive matter. If it were decisive, one might expect two articles absolutely alike to be sold to different individuals at different prices, for utilities differ even more than tastes, since circumstances, especially complementary relations, as well as natural and acquired desires and interests, affect utility.

Granted that the supplies are two, or that they cannot ordinarily be substituted for one another, degree of control possessed by the producer over the separate supply of each is the important fact. But a qualification is necessary to the extent that the exploitation of any by-product always involves some expense that would not otherwise be incurred, and this means that in no case is the supply of an economically serviceable article (an economic product) entirely unaffected by economic considerations or under entirely extraneous or non-economic control.

[1] Pigou and Taussig in the Quarterly Journal of Economics, vol. xvii, (1912–13) pp. 378, 535, 687.

From this point of view, joint production is a relative matter. It is only the extreme case of a situation that is common, and also important, even where the characteristic element in the situation would not in all degrees be understood as one of joint production and joint cost. When there is a physical facility available for economic exploitation but largely unused, of which the possible extent of utilization is indefinite, the situation is certainly worthy of attention, whether we call it a case of joint cost or not. Quantity of physical performance may be in some determinate proportion to the service of a related demand where the performance is not of the nature of an economic supply. This is the case with back-haul empty cars. There is no economic supply until some small use is made of the empty mileage. The utility resulting from the unintended part (economically speaking) of the whole performance may be nil, in which case there is a failure of economic service or production. Or the situation may be that of physically idle, as well as necessarily at the same time economically unutilized, capacity.

An electric generating plant must be constructed with reference to taking care of the peak of the load. Its capacity at any other time of the day and year is to a large extent unutilized. Some plants in small towns shut down during the daytime. If capacity formerly unutilized comes to be applied to drive motors for manufacturing purposes, are not the kilowatt hours so supplied to some extent joint products with the kilowatt hours sold for lighting purposes? If the intervals of small load can be further exploited, perhaps by the use of electric energy for refrigeration, does not the same question arise, to be answered in the same way? Yet carefully measured physical units of a given form of energy would seem to be about as homogeneous as anything can be.

A similar illustration is afforded by street railways. Transportation service offered may best be measured in terms of seat miles operated; and passenger service economically exploited or enjoyed may be measured in terms of passenger miles ridden. A street railway cannot possibly so arrange its schedule that these two match each other. Rush-hour back-haul seat miles are in effect a by-product. Of course, most such seat miles are no product at all in a strictly economic sense; they are an incidental waste of energy that might have been productive. But any attempt more fully to exploit such seat miles would naturally treat them as a by-product.

These cases are analogous to that of a steam railroad that more fully utilizes its roadbed by differentially low rates for certain kinds of freight. That there is no fixed ratio between the quantities of the various economic services obtained from a single instrument does not seem to be of decisive economic interest. Even where the by-product is a material good, it may have any degree of importance subordinate to that of the main product, and the quantity obtained will often be made to vary somewhat according to its importance. It may be commercially worth nothing and still be a true by-product. Some cotton seed was always required for planting, but most cotton seed long was mere waste. The by-products of coal-gas manufacture are more variable and more subject to control, but they are not therefore less truly by-products, than the cotton seed. Indeed, the gas is the by-product and the coke the main product where blast-furnaces demand the latter. The different conditions of course involve differences in the quality of both gas and coke; which fact does not involve any change in underlying economic principles. If a strict conception of jointness of supply makes it a physical rather than an economic matter, then the

economist is interested rather in the larger fact that some goods and services are available in quantities that do not vary directly in response to increase or decrease in the demand for them. Under these circumstances it would seem not to make much difference how we determine whether one or more separate products or services are being supplied. The working distinction is made by consumers in their views on discrimination.

To repeat, the economy of full utilization of product and capacity is the foundation of the significance of joint cost. Possibly, because of some restrictive formal definition that distracts attention from functional similarity, one may refuse to call all cases exhibiting the characteristic results of this situation cases of joint cost; but this seems to the writer unessential. The various cases belong functionally in the same general economic category.

IV

The question whether joint cost — which the preceding discussion may warrant us in taking in the broad sense as relating to the economy of full utilization — or monopoly power is the cause of price differentiation has been much debated.[1] There can be no doubt that a monopoly would be inclined to differentiate, and since by hypothesis it has the power to differentiate, monopoly power is doubtless a sufficient cause of differentiation; in other words, it may be the decisive circumstance or influence. As to the modes of differentiation, a monopoly will, doubtless, both on economic grounds and from the need of conciliating public opinion, follow practically the course dictated by considerations of joint

[1] J. M. Clark, in chap. 1, "Railways and the Law of Cost," of his Standards of Reasonableness in Local Freight Discriminations traces the development and interrelation of the two points of view, but without coming to any definite conclusion.

cost. There remains to decide the question whether joint cost could produce differentiation under competitive conditions.

Altho competitive enterprises are much hampered by lack of control of the situation, just as they would be in instituting any price policy, it seems to the writer that a considerable degree of differentiation might still be developed. A 30 per cent annual load factor for an electrical enterprise is good. Will a plant that does not try to utilize the other two-thirds of its capacity by low rates be stronger competitively than one that does? Will not competition tend to cause the development of a differential system under such circumstances? If, indeed, the original consumers will not consider other than a straight kilowatt-hour rate (a kind of influence already dealt with), and if they have a choice between different sources of supply, it will not. But in fact consumers do not object to a lowering of the rate per kilowatt hour as the average hours' use increases. It is true that the company will be in better position to push its enterprise by way of differential rates if it has a monopoly hold on the original business. But the possession of large fixed capital only partly utilized seems to be more fundamental.

The situation of a railroad transporting chiefly freight is somewhat different, because the supply does not have to be provided at the moment of demand. It is the necessity of producing at the moment of demand which makes the electrical rate question peculiarly interesting. But the carriage of a consignment of freight cannot be long postponed without the loss of the business. Even for the road with the densest traffic, taking the year as a whole, there is bound to be some falling short of complete utilization. The more important element in the situation, however, is the fact that railroad lines are

built long before they can be fully utilized. Hence if they can get low-grade freight by accepting less than the necessary general-average ton-mile rate, there will unquestionably be sound economic reasons for thus differentiating. Tho the increase of business will in time require double-tracking, the average fixed charges per ton-mile carried will be less on a double-track than on a single-track road, so that even the imminent necessity of providing additional facilities will not much qualify the desirability of increasing business by differentiation. The American public does not expect that, after due allowance for incidental differences in methods of handling, coal and manufactured products will be carried at the same (or equivalent) rate. It is feasible, as a matter of fact, to treat the ton-mile sold to the coal-mine operator, to the dry-goods jobber, and to the copper smelter as different "commodities." Likewise with the kilowatt hours sold for domestic lighting and for elevator service. If a specially low rate is necessary in order that a railroad or an electrical company get a particular class of business at all, not only will that class of shippers or consumers demand such a rate, so far as is consistent with the profits of the public-service corporation, but public opinion, at least that of the mercantile community, will support such a demand. The problem of obtaining a great volume and especially a great variety of business in order to meet heavy fixed charges is certainly not peculiar to monopolies and certainly has a formative influence on differential rates.

If we could find a branch of production requiring heavy investment in fixed and specialized capital where competition nevertheless ruled, and if we should find differentiation there practised in order to promote full utilization of plant, that situation would constitute the needed crucial instance. Ocean freight rates appear to

yield approximately such a case. Competition is keen and differentiation is practised, especially in relation to "berth cargo." The printing and publishing business affords another approximate case. If we consider the use of a set of book plates in printing to be a homogeneous service and one for which an equal charge for each copy impressed may be expected, then the sale of a $1.50 and a fifty cent book printed from the same plates, and differing only in the quality of the paper and binding to the extent of a few cents, is a case of differentiation. Of course, for each single book copyright gives a monopoly; but for the supply of popular novels, or of serviceable school books, which are tolerably homogeneous as put out by various publishers, such differentiation is a competitive device. The devices by which different prices are paid for subscriptions to the same magazine constitute a similar example. The practice of charging less to new subscribers is well established and general.

One's attitude towards the debate on this question — whether fixed charges or monopoly cause differentiation — will naturally be influenced to a considerable extent by the degree to which one accepts or rejects a certain false premiss of much economic reasoning, to the effect that a given sort of economic phenomenon must be explicable by some single "cause." This is no place to argue the point at length; the writer can only state his opinion that any phenomenon is explicable only by a complex of many antecedents, conditions, circumstances, or "causes" — call them what you will — and that primacy among them is chiefly a matter of the various degrees of what "goes without saying," of what will be mentioned by one who is careful to be comprehensive, and of what calls for particular attention as the decisive factor under the circumstances assumed or described. To suppose that a specified sort of effect has

one and only one cause seems to be a sort of personification of events and objects — a survival of fetichism. To illustrate by reference to Marshall's analogy of the scissors, and to the controversy regarding the explanation of value to which this analogy relates, the writer believes it is correct to say that, where one blade is held in a vise, it is the moving blade that does the cutting, in the sense that its motion is the decisive factor and the rest is condition, circumstance, or what not. But it is equally possible that either one of the two blades may, in this sense, do the cutting; that is, that the decisive factor in the determination of value may be either on the side of supply or on that of demand. And it may be necessary to attend to both blades; their action will usually be neither entirely disparate nor of equal importance. Whether there is or is not a similar reciprocity of action between the two causes of differential rates, the illustration serves to emphasize the point that we need not regard monopoly power as the sufficient and only cause of differentiation, merely because by itself it may be made to provide a clear-cut explanation of the phenomena in question. Indeed, the joint-cost or full-utilization explanation goes to the economic foundations of the matter in a way to entitle it to a larger place than the monopoly explanation. Monopoly merely gives the economic and commercial motives of the dealer freer scope. What he will do if he has the power will be to fix prices in a way to utilize his fixed capital to the fullest, incidentally saving himself inconvenience by classifying his customers. Where he will charge high rates, and where low, is indicated by the joint-cost theory.

V

Altho wholesale discounts are not ordinarily brought under the theory of differential prices, the writer has so classed them.[1] The fundamental reason for a difference in price according to quantity purchased is of course of an entirely different nature. But once such a difference is accepted, its degree may be differential in motive and effect, just as differences of quality and kind are exploited differentially. It has been also pointed out by the writer that the competition of the isolated plant, affecting only large consumers, may be considered a justification for some degree of differentiation of the same nature. The cases are again mentioned here chiefly to illustrate the broad scope of the principle. This particular case of differentiation through wholesale prices also serves to illustrate the fact that differentiation is not absolutely conditioned by monopoly power.

The presence of a differential element in methods of retail price-fixing should also be noted in this connection. Retailers determine prices by adding to what was paid the manufacturer or wholesaler certain percentages *ad valorem* for handling the articles they sell. This procedure conforms to the principle of charging what the traffic will bear — since the purchaser of the more valuable article is charged more without specific reference to the character of the service performed — rather than to a policy of obtaining reimbursement for specific costs. The article that costs more at wholesale is not therefore of greater bulk or weight than the less costly article. Interest and insurance may add a trifle more to the basic original cost in the former than in the latter case. But such ascertainable differences seldom affect the percentages used.

[1] Cf. the article in the preceding (May) number of this Journal, p. 544.

VI

It has been argued that rates can be based on specific cost and in the long run should be; that all costs can be assigned to the products or services to which they are due on the basis of the proportionate use the products make of the means of production, and that, when this is done, there remains nothing to distribute differentially.[1] All costs certainly can be apportioned. But that fact of itself is no more significant than is the possibility of obtaining an arithmetical average of any fortuitous collection of numbers. It is also true that for most costs there is a fair and reasonable basis of apportionment. The exact whereabouts of the line of distinction between this problem and that of the disentanglement of separable costs — still by way of averages and for classes of commodities or services, not for individual consumers — may be difficult to determine.

Rails wear out, tho it may take twelve or fifteen years, and their cost can be pro-rated on the basis of the use made of them, just as the cost of a trainman's wages is pro-rated over the objective services to which he devotes his time. But the likeness of the two cases is not complete. That the rails will have to be replaced sometime is not the fundamental point, tho the brevity of the time during which a given kind of expense is effective — its rate of turnover, so to speak — is an important aid in the isolation of costs. The causal connection between use and cost is more likely to be close when the period of use is short, especially when there is but one use obtainable, as in the case of a processive good like fuel.[2] The

[1] This appears to be the dominant point of view of our public-utility commissions. But since the fundamental problem for a rate-regulating body is the separation and just apportionment of costs, it is hardly to be expected that such a body will attempt nicely to distinguish separation from apportionment, especially since the two shade into each other.

[2] That is, in order that the so-called "variable" costs conform to the assumption ordinarily made, they must be special in time as well as special in incidence.

crucial question, however, remains this: whether replacement becomes necessary after a given number of uses, and in proportion to use, or after a given period of time, with little or no reference to degree of utilization. If a locomotive's expectation of life in full service is determined by miles-run only and not by obsolescence and the like, then this element in cost per locomotive mile is determinate and separable; but if it is to be displaced at the end of ten or fifteen years whether it has run so many miles or twice as many, then average cost per mile is not something to build on, but merely a result of degree of utilization.[1] Deterioration of rails, for example, is not proportionate to use; still less is that of ties. In fact, depreciation in general is as likely to be due to rotting or rusting out as to " wearing " out. The cases where deterioration is more nearly in proportion to time than to wear and tear are numerous. Especially if obsolescence be taken into account, it is evident that the uses of fixed capital in general are, to a great extent, deciduous. If the fullest utilization is not made in season, certain potential uses are simply lost and the total cost has to be apportioned over fewer uses. Cost is, therefore, higher by reason of the failure of a fuller degree of utilization, such as might have been obtained, perhaps, by way of differentiation. Cost accountants are too likely to assume relations as fixed which may change as a result of prices based upon their cost analysis. Rates for electricity based upon load-factor considerations most forcibly illustrate the insecurity of

[1] M. O Lorenz in his article on " Constant and Variable Railroad Expenditures " in the Quarterly Journal of Economics, vol. xxi, p. 283, fails to see that these terms he employs as title do not sufficiently indicate the important distinction, which is between expenses that vary *with time* (or eternity), on the one hand, and those that vary with *amount of use*, on the other. Nor is it of great practical importance that, if a railroad could select from among the classes of business that come to it, after it has once become well established, it might be wise for it to take only the most profitable and not to expand — despite the importance of diversified loading and the applicability to this situation of the general principle of increasing returns.

amount of actual use of fixed capital as a basis of cost apportionment. Differential rates may lower cost. Tho unquestionably cost analysis is important for this, as for any sort of price policy, a differential policy cannot be purely a matter of cost accounting after the facts have occurred.

Fixed-capital costs in general are in proportion to time rather than to use; hence the unit cost per use unit depends upon whether the price policy of a company promotes full use. This holds of carrying charges in general — of interest, rentals, and necessary dividends unqualifiedly, and of maintenance so far as proportioned to time rather than to use. Obsolescence is particularly important in electrical industries. The importance of high degree of utilization as a reason for lower cost is clearer in the case of electricity supply than anywhere else because of the obvious special importance of the load factor as well as because of the importance of the more generally effective density factor.

A conspicuous instance of the fallacious assumption that apportionment according to some measure of use yields separated costs is afforded by the discussion of demand or capacity charges in connection with electrical rates. If we suppose that the peaks of all consumers coincide and directly constitute the station peak, the responsibility for the latter is quite definite. But in any actual case there is more or less diversity. Shall we discount each individual maximum demand in the ratio of the general diversity factor? Or shall we make the demand charge of each consumer proportionate only to his share in the station peak, that is, to his "simultaneous" demand? Shall we then exempt from any demand charge the consumer who requires no current at the time of the station peak? In that case, what if the load becomes smooth and nearly or practically con-

stant for four or five hours of heaviest loading? Is not the whole question really one of policy, and should not the apportionment vary according to the needs of the company in building up its load factor? Some small plants can better afford to shut down during the daytime than to run at all. Others may have a daylight load about equal to their evening load. Is there any "use" rule of apportionment that will cover both these extremes and the usual intermediate situation? Must not the company plan its rates with reference to the growth of business and adjust them accordingly from time to time, and is not this policy in contrast with, nay the opposite to, pro-rating costs and the procedure of most cost accountants?

VII

The reader will observe that in the present discussion no such fundamental opposition is found between prices based upon cost on the one hand, and differential prices on the other, as is ordinarily assumed. Differentiation is properly based on cost analysis, but a kind of cost analysis that takes account of expected results as well as of present conditions; not on mere cost accounting, which is a much more limited thing. If we wish to keep strictly to the cost-accounting point of view, there is a degree of opposition between the cost element and the differential element in price, the former being separable in fact and the latter merely apportionable according to some theoretical or arithmetical assumption. The writer can see little significance in the familiar, if not hackneyed, contrast between so-called "cost of service" and "value of service" theories. The latter seems to be a more plausible, only because rather high sounding, mode of stating the principle of "what the traffic will

bear." Cost, in the broad sense, should be of more decisive influence than value. The latter under a well-worked out differential theory operates only through the effects of price (value) upon cost. Cost is therefore the fundamental matter. But cost itself must be judged with reference to the volume of service that ought to result from cost. The strongest argument for differentiation rests on the general social ground that such a policy favors maximum service to the public.[1]

From this point of view, aggregate cost, including therein a fair return upon capital (plus a premium for efficiency or minus a fine for inefficiency), should doubtless fix the aggregate of prices, since the rendering of the maximum volume of service requires that rates be kept down. It supposes low average rates because the lowest rates will be given to the most elastic or expansive kinds of demand, which will therefore count for most in the weighted average charge and cost in question. But separable cost fixes the lower limit of any rate, for the obvious reason that an enterprise cannot prosper on out-of-pocket losses because there are " so many " of them. This statement is subject to qualification if there is a return to the community that the recipient of the direct service will not adequately recognize in the price he is willing to pay for it; but service of this sort cannot ordinarily be brought within the scope of the rule under discussion, or, when such a policy is indicated, the enterprise should be conducted by the government and not as an ordinary business affair. However, it is only separable cost that must or can have a direct causal connection with rates for specified goods or services, and a quantitatively definite effect upon them. The remainder of total costs are properly apportionable ac-

[1] That cost not normally resulting in service should have no direct share in price is properly a part of the same view. The service must be performed efficiently in order that the claim to the return of cost, including necessary profit, be justified.

cording to general conditions and policies, so that the share alloted to a particular good or service is only in part due to its own characteristics. Doubtless all this is highly theoretical and will not by itself solve any concrete rate problem. But in matters of general policy — and differential rates come under this head — mistakes are due to a failure to develop clear ideas quite as often as to insufficient attention to the details of the concrete situation that confronts the practical man.

Electrical rates are of great importance in another respect: not only in the general way discussed in the foregoing pages, but also in the implied suggestions towards carrying out a differential policy impersonally. The principle of maximum service is too widely and variously indicated to be deemed a contribution from the consideration of electrical rates. But two-charge and three-charge rates — even tho these also are not quite peculiar to electricity supply — are distinctive and are characteristically suggestive. The superiority of such multiple-charge rates as a method of differentiation consists in the even and balanced impersonality with which the differential policy — so often under suspicion for unjust discrimination — can be applied through their use. A single charge, it is true, can be so graduated that its variations are continuous. But it takes account of variation in only one dimension. Two principles of variation may be recognized by way of two charges; or, what is more to the point, one charge may be made to vary with separable costs and the other according to differential principles. The electrical-rate demand charge is properly treated in the latter way. Both the kilowatt-hour charge and the consumer charge, on the other hand, reflect separable costs.[1] And there is

[1] The three-charge electrical rate is like what a railroad rate would be if it were composed of a terminal charge plus a mileage charge, and then plus something for the differential loading of fixed charges.

also need of differentiation according to the diversity factor. The desired impersonal quality *appears* to attach to mere quantity discounts; but these involve concessions to mere bargaining power — which is directly opposed to impersonal justice in rate-making — and they encourage an artificial adjustment of service conditions. Pure quantity discounts should therefore be scanned with suspicion. Density-factor discounts are not open to the same objection. The " increment-cost " analysis that is ordinarily adduced in favor of an extreme application of quantity discounts in individual cases cannot be expected to result in the establishment of general and permanent rates. Classification as a method of applying cost analysis, even tho the analysis be correct, is crude as compared with methods actually in use in electrical rate schedules — tho doubtless actual rates, even where there is back of them adequate analysis with reference to the different variables, will usually employ classification rather than multiple charges.

From the rendering of maximum service to the public as a guiding principle, there is an easy transition to the fixing of rates with more or less reference to general considerations of public policy. To a certain extent this would seem to be a legitimate expectation in the case of corporations performing services " affected with a public interest." A private corporation, however, even a public-service corporation, cannot well carry the principle so far as a government enterprise may. For the former the rule nevertheless suggests itself: when in doubt, it is better to be public-spirited. Even tho business men will transcend ordinary business principles and habits only when the application of these familiar guides leaves them in doubt, the twilight zone between what is and what is not separable cost is so important

that the attitude suggested would be of considerable practical effect in rate-making. The rule of maximum service is itself a rule of public policy, and the policy of differentiation in general should be pursued in this spirit rather than in one of mere profit-making. The policy of differentiation is not necessarily a mere commercial device; it has broad and firm foundation in economic principles that relate to enduring social welfare.

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